TECHNICAL NOTES

COFFEEVILLE PLANT MATERIALS CENTER

NO. 1 Coffeeville, Mississippi 1989

INITIAL EVALUATION OF TRAILING WILDBEAN

Abstract

Thirty-two accessions of trailing wildbean (Strophostyles spp.) were evaluated from 1985 through 1988 for soil improvement and conservation purposes. On the basis of appearance or vigor, ten accessions were selected for advanced studies. Three of these were obtained through the National Plant Materials Center (PMC); the remainder were collected in Mississippi, Arkansas, Louisiana, and Texas. As a group, the wildbeans showed sufficient variation for selection of a superior cultivar for conservation application.

Introduction

Trailing wildbean, Strophostyles helvola (L.) Elliott is an annual herbaceous warm-season legume. It occurs on alluvial and sandy soils from Florida to Texas, northward to Minnesota and eastward to Quebec. It is a nitrogen-fixing plant, and thus contributes to the growth of associated plants. According to Graham (1941), this species has good volunteering characteristics and the seeds are used by gamebirds. The rapid growth of this plant makes it potentially useful for erosion control on disturbed sites within forests, such as temporary logging roads and log loading areas. The capacity to fix nitrogen and the use by gamebirds would be additional benefits.

Materials and Methods

The plant materials assembled at the Coffeeville PMC for this initial evaluation trial came as field collections of seed from the Coffeeville PMC service area and from other PMCs. A total of 32 accessions were assembled, including 22 of Strophostyles helvola, one of S. leiosperma, three of S. umbellata, and six shown only as Strophostyles sp. Eight accessions were collected in Arkansas, three in Louisiana, and ten in Mississippi; five were received from the Knox City (TX) PMC and six came from the National PMC at Beltsville, Maryland.

The test plot at the Coffeeville PMC was Oaklimeter silt loam, 0-2 percent slope. Each year 8-24-24 fertilizer at a rate of 300 pounds per acre was added to this plot. For evaluation years 1985-87, this plot was thoroughly plowed and each accession was seeded approximately 1.5 cm deep in rows 6M long X 2M apart. Planting dates were 05/16/85, 03/31/86, and 04/13/87. In 1988, seeds from the 1987 crop were allowed to reseed each respective row. The area was cultivated and hand weeded as necessary to control weeds, and a four-foot wide neutral strip between plots was maintained to prevent accessions from growing together.

Plant evaluations were made following procedures shown in the National Plant Materials Manual (USDA, 1984). Factors relating to vigor, stand, foliage abundance, and seed production were of primary importance.

Height and width were measured in centimeters, and all other ratings were subjective on a scale of 1-9 with 1 best and 9 poorest.

Results and Discussion

Data for evaluations of all accessions from 1985 through 1988 are in Table I. These were analyzed statistically in a method similar to that used in the initial evaluation of Indiangrass (Coffeeville PMC, 1985) and other species.

Because of the vining habit of Strophostyles, criteria such as height and width used for mean separation for other initial evaluations were of questionable value. Neither were the subjective evaluations for resistance to environmental factors (disease, insect, heat, and drought) or seed production valuable because means for the majority of the accessions were not significantly different. Only with vigor was it possible to cull out fewer than half of the accessions using the Duncan's multiple range test. For this analysis, early season (VIG-1) and late season vigor (VIG-2) data were first averaged for each year as in earlier reports (Coffeeville PMC, 1985), but this did not exclude as many accessions as did the product of VIG-1 and VIG-2. Outstanding accessions selected by the latter method were the following:

Accession	Species	Origin
434455	S. helvola	Washington Co., MS
9008290	S. helvola	Colorado Co., TX
9013735	S. umbellata	National PMC
9017145	S. helvola	National PMC
9017146	S. helvola	National PMC
9021718	S. helvola	Washington Co., MS
9021719	S. helvola	Crittenden Co., AR
9028588	S. sp.	Yalobusha Co. MS
9028592	S. helvola	Franklinton, LA
9028599	S. helvola	Yalobusha Co. MS

Even without evaluation data, accessions of the less-robust S. leiosperma could have been easily excluded as contenders. The remainder, variously named, exhibited differences, but no one accession was evidently superior. Criteria for selection of a conservation plant are seed production and ability to adapt or thrive under rigorous conditions. Both of these criteria may be tested in the normal plant materials evaluation process (USDA, 1984). Seed production may be determined quantitatively in advanced evaluations, and adaptation may be determined in a series of plantings with climatic and soil differences.

Conclusions

The analyses showed the assembly to be easily separated into two groups: 1) a small group of very poor performers that could be culled easily and 2) a larger group of good performers with none clearly outstanding.

However, the larger group showed enough variation to indicate that an improved cultivar could be selected. Empirical data are needed to determine the best seed producer, and a series of plantings at different locations is needed to determine the range of adaptation.

References

Coffeeville PMC. 1985. Technical Notes No. 4. Initial Evaluation of Indiangrasses.

Graham, Edward L., 1941. Legumes for Erosion Control and Wildlife. U.S. Government Printing Office, Misc. Publication 412.

USDA. 1984. National Plant Materials Manual. Title 190.

INITIAL EVALUATIONS FOR TRAILING WILD BEAN AT COFFEEVILLE PMC

ACCESSION	YR	PCT STD	FOLIAGE ABN	FOLIAGE UNI	FOLIAGE HT	FOLIAGE WD	VIG 1	VIG 2	RESISTANCE DI	RESISTANCE IN	RESISTANCE HE	RESISTANCE DR	MATURE DATE	SEED AM	SEED FI	SEED UN
434,454	85	100	4	1		274	3		1	1	1		10/10/85	3	2	3
	86	100	3	1	30	150	4	4	1	1	1	1	10/06/86	5	1	2
	87	100	2	1	21	183	3	2	1	1	1	1	09/22/88	3	1	
	88	100	3		20		4	3		1		2				
	Ave.	100	3	1	24	202	4	3	1	1	1	1	10/03	4	1	2
434,455	85	100	5	1		213	3		1	1			10/04/85	2	1	1
	86	80	3	1	40	150	3	2	1	1	1	1	10/06/86	3	1	1
	87	100	1	1	25	275	2	2	1	1	1	1	09/25/87	4	1	
	88	100	1		28		2	2		1		1				
	Ave.	95	2	1	31	213	2	2	1	1	1	1	10/02	3	1	1
9,008,290	85	100	1	1		274	2	1	1	1	1		10/04/85	1	1	3
	86	100	3	1	40	110	3	3	2	1	1	1	09/07/86	5	1	3
	87	100	2	2	26	183	3	2	1	1	1	1	09/25/87	5	1	
	88	100	2		25		2	2		2		1				
	Ave.	100	2	1	30	189	2	2	1	1	1	1	09/22	4	1	3
9,008,293	85	100	2	1		274	3		1	1	1		10/10/85	2	1	1
	86	100	3	1	35	120	3	3	1	1	1	1	10/15/86	5	1	3
	87	100	2	1	26	213	3	2	1	1	1	1	09/25/87	5		
	88	75	3		25		3	3		3		1				
	Ave.	94	2	1	29	202	3	3	1	2	1	1	10/07	4	1	2
9,012,601	85	100	3	3		274	4		1	1	1		10/04/85	2	1	1
	86	100	5	3	35	140	4	4	3	1	1	1	10/06/86	3	1	3
	87	100	4	1	10	275	4	4					09/18/87	2	1	
	88	100	3		20		4	3		2		1				
	Ave.	100	4	2	22	230	4	4	2	1	1	1	09/29	2	1	2
9,012,602	85	100	3	2		183	2		1	1	1		10/04/85	4	1	1
	86	100	4	3	35	120	4	4	2	2	1	1	10/06/86	4	3	3
	87	100	4	2	20	183	2	4					09/22/87	3	1	1
	88	100	2		23		3	2		1		4				
	Ave.	100	3	2	26	162	3	3	2	1	1	2	10/01	4	2	2
9,013,735	85	100	2	3	23	244	3		1	1	1		10/04/85	1	2	2
	86	100	3	2	40	140	3	2	1	1	1	1	10/10/86	4	1	3
	87	100	3	2	20	183							09/18/87	3	1	1
	88	100	3		23		3	3		1		2				
	Ave.	100	3	2	26	189	3	2	1	1	1	2	10/01	3	1	3

INITIAL EVALUATIONS FOR TRAILING WILD BEAN AT COFFEEVILLE PMC

ACCESSION	YR	PCT STD	FOLIAGE ABN	FOLIAGE UNI	FOLIAGE HT	FOLIAGE WD	VIG 1	VIG 2	RESISTANCE DI	RESISTANCE IN	RESISTANCE HE	RESISTANCE DR	MATURE DATE	SEED AM	SEED FI	SEED UN
9,017,145	85	100	3	3		244	3		1	1	1		10/04/85	3	1	1
	86	100	3	1	40	95	3	3	3	1	1	1	09/17/86	5	3	3
	87	100	2	1	31	145	3	2	1	1	1	1	09/18/87	3	1	
	88	100	2		31		2	2		2		3				
	Ave.	100	2	2	34	161	3	2	2	1	1	2	09/23	4	2	2
9,017,146	85	100	3	3		274	3		1	1	1		10/04/85	3	1	1
	86	100	3	1	35	130	3	3	1	1	1	1	09/17/86	4	1	3
	87	100	3	1	25	183	3	2	1	1	1	1	09/18/87	3	1	
	88	100	1		28		3	1		1		1				
	Ave.	100	2	2	29	196	3	2	1	1	1	1	09/23	3	1	2
9,017,147	85	100	3	3		274	4		1	1	1		10/04/85	3	1	1
	86	100	3	1	35	120	3	4	1	1	1	1	10/06/86	6	3	3
	87	100	2	1	31	183	3	2	1	1	1	1	09/18/87	3	1	
	88	80	4		23		3	4		2		2				
	Ave.	95	3	2	30	192	3	3	1	1	1	1	09/27	4	2	2
9,017,148	85	100	4	2		92	4		1	1	1		10/04/85	5	1	1
	86	50	5	1	15	40	5	6	3	3	1	1	09/17/86	7	1	3
	87	75	5	1	10	120	4	5					09/08/87	3	1	2
	88	40	6		13		5	5	2	2		1				
	Ave.	66	6	1	13	84	4	5	2	2	1	1	09/20	5	1	2
9,017,149	85	55	6	3	12	36	5		1	1	1		10/04/85	7	1	1
	86	5	7	1			7	0								
	87	0					0									
	88	7	6		15		4	4		2		1				
	Ave.	17	6	2	14	36	6	7	1	2	1	1	10/04	7	1	7
9,021,717	85	100	3	1		274	2						10/04/85	1	1	1
	86	100	4	1	35	130	4	4	1	1	1	1	10/06/86	3	1	1
	87	100	2	1	21	225	3	2	1	1	1	1	09/25/87	4	1	
	88	100	2		28		5	2		1		1				
	Ave.	100	3	1	28	210	4	3	1	1	1	1	10/02	3	1	1
9,021,718	85	100	3	1		213	3		1	1	1		10/04/85	1	1	1
	86	100	1	1	45	170	1	1	1	1	1	3	10/06/86	2	1	3
	87	100	2	1	21	244	3	2					09/25/87	2	1	
	88	100	2		25		3	2		1		1				
	Ave.	100	2	1	30	209	2	2	1	1	1	2	10/22	2	1	2

INITIAL EVALUATIONS FOR TRAILING WILD BEAN AT COFFEEVILLE PMC

ACCESSION	YR	PCT STD	FOLIAGE ABN	FOLIAGE UNI	FOLIAGE HT	FOLIAGE WD	VIG 1	VIG 2	RESISTANCE DI	RESISTANCE IN	RESISTANCE HE	RESISTANCE DR	MATURE DATE	SEED AM	SEED FI	SEED UN
9,021,719	85	100	1	1		274	3		1	1	1		10/10/85	2	1	1
	86	100	2	1	45	120	3	1	1	1	1	1	10/06/86	5	1	
	87	85	6	4	15	183	4	3	1	1	1	1	09/25/87	4	1	
	88	100	2		26		3	2		2		1				
	Ave.	96	3	2	29	192	3	2	1	1	1	1	10/04	4	1	7
9,021,720	85	0					0									
	86	0														
	87	75	3	2	31	200	2	2	1	1	1	1	09/25/87	4	1	
	88	95	3		28		3	3		2		1				
	Ave.	42	3	2	30	200	5	2	1	2	1	1	09/25	4	1	
9,028,013	85	100	3	2		274	3	2	1	1	1		10/04/85	2	1	2
	86	90	3	1	40	80	3	3	1	1	1	1	10/15/86	5	1	5
	87	70	4	1	31	122	4	3	1	1	1	1	09/25/87	5	1	
	88	80	3		25		3	3		2		2				
	Ave.	85	3	1	32	159	3	3	1	1	1	1	10/05	4	1	4
9,028,293	85	100	5	2	8	183	5		1	1	1		08/15/85	3	1	3
	86	5	7	1	10	45	7	0				9				
	87	50	4	1	6	170	4	3	1	1	1	1	10/10/87	2	1	
	88	60	3		15		4	2		1		1				
	Ave.	54	5	1	10	133	5	5	1	1	1	4	09/12	2	1	3
9,028,331	85	0					0									
	86															
	87	100	2	1	41	175	3	2	1	1	1	1	09/18/87	3	1	
	88	100	3		25		3	3		2		2				
	Ave.	67	2	1	33	175	5	2	1	2	1	2	09/18	3	1	
9,028,588	85	75	4	3		274	4		1	1	1		10/04/85	2	1	1
	86	100	2	1	50	155	2	1	1	1	1	1	10/06/86	3	1	1
	87	100	1	1	38	244	3	1	1	1	1	1	10/02/87	4	1	
	88	100	3		20		4	3		2		2				
	Ave.	94	2	2	36	224	2	1	1	1	1	1	10/04	3	1	1
9,028,588	85	0					0									
	86	0					0									
	Ave.	0					10									

INITIAL EVALUATIONS FOR TRAILING WILD BEAN AT COFFEEVILLE PMC

ACCESSION	YR	PCT STD	FOLIAGE ABN	FOLIAGE UNI	FOLIAGE HT	FOLIAGE WD	VIG 1	VIG 2	RESISTANCE DI	RESISTANCE IN	RESISTANCE HE	RESISTANCE DR	MATURE DATE	SEED AM	SEED FI	SEED UN
9,028,592	85	100	4	3		274	4		1	1	1		10/04/85	3	1	3
	86	100	1	1	50	145	1	1	1	1	1	1	10/10/86	4	2	2
	87	100	1	1	31	213	3	1	1	1	1	1	10/02/87	3	1	
	88	100	1	1	41		1	1		1						
	Ave.	100	2	2	41	211	2	1	1	1	1	1	10/05	3	1	2
9,028,596	85	95	4	3	15		4		1	1	1		11/14/85	2	1	1
	86	0					0									
	87	35	5	2	10	152	3	5					09/18/87	2	1	1
	88	25	5		15		4	5	2	1						
	Ave.	39	5	2	13	152	5	5	2	1	1		10/16	2	1	1
9,028,599	85	100	4	2		274	3		1	1	1		10/04/85	3	1	1
	86	100	2	1	50	105	3	1	2	1	1	1	10/06/86	3	1	3
	87	100	1	1	36	183	2	1	1	1	1	1	09/23/87	3	1	
	88	60	4		25		4	3		2		4				
	Ave.	90	3	1	37	187	3	2	1	1	1	2	10/01	3	1	2
9,028,600	85	100	4	3		213	3		3	1	1		10/04/85	3	1	2
9,029,007	85	100	5	1	10	92	5		1	1	1		10/14/85	8	3	1
9,029,008	85	100	1	2	31	274	2		1	1	1		10/04/85	2	1	1
	86	100	2	1	35	105	2	3	1	1	1	1	10/10/86	5	1	3
	87	100			20	183	3	4					09/22/87	4	1	1
	88	100	5		20		3	4		2		3				
	Ave.	100	3	2	26	187	2	4	1	1	1	2	10/02	4	1	2
9,029,009	85	100	4	4		274	4		1	1	1		10/04/85	2	1	1
	86	75	6	1	40	90	5	4	1	1	1	1	10/06/86	6	1	5
	87	100	2	1	26	183	3	2	1	1	1	1	09/22/87	2	1	1
	88	80	5		23		4	5		2		1				
	Ave.	89	4	2	30	182	4	4	1	1	1	1	10/01	3	1	2
9,029,010	85	0					0									
	86	0					0									
	Ave.	0					10									
9,045,267	85	100	3	3		366	4		1	1	1		10/04/85	1	1	1
	86	75	3	1	35	152	3	3	1	1	1	1	10/06/86	3	1	3
	87	100	3	1	20	213	3	3	1	1	1	1	10/02/87	4	1	
	88	100	2		31		2	2		1		3				
	Ave.	94	3	2	29	244	3	3	1	1	1	3	10/04	3	1	2

INITIAL EVALUATIONS FOR TRAILING WILD BEAN AT COFFEEVILLE PMC

ACCESSION	YR	PCT STD	FOLIAGE ABN	FOLIAGE UNI	FOLIAGE HT	FOLIAGE WD	VIG 1	VIG 2	RESISTANCE DI	RESISTANCE IN	RESISTANCE HE	RESISTANCE DR	MATURE DATE	SEED AM	SEED FI	SEED UN
9,045,274	85	75	4	3		122	4		1	1	1		10/04/85	2	1	1
	86	7	3	1	15	80	5	3	1	1	1	1	10/15/86	5	1	1
	87	80			15	135	3	4					09/18/87			
	88	80	4		23		3	4		4		3				
	Ave.	60	4	2	18	112	4	4	1	2	1	2	10/02	4	1	1
9,045,275	85	75	3	3		183	4		1	1	1		10/04/85	2	1	1
	86	90	3	1	45	120	3	3	1	1	1	1	10/06/86	4	1	3
	87	85	4	2	15	152	3	4					09/18/87	3	1	1
	88	40			15		4	4		2		1				
	Ave.	72	3	2	25	152	4	4	1	1	1	1	09/28	3	1	2
9,045,277	85	100	5	3			5	4	1	1	1		10/04/85	3	1	
	86	5	5	1	15	40	5	7	1	1	1	1	10/06/86	9	1	
	87	5	6	1	5	90	7	6					10/15/87			
	88	15	6		15		5	6		1		3				
	Ave.	31	6	2	12	65	6	6	1	1	1	2	10/08	6	1	

NOTE: Value of zero (0) converted to 10 to obtain averages for foliage abundance (ABN) and uniformity (UNI); vigor (VIG); resistance to disease (DI), insects (IN), heat (HE), and drought (DR); and seed amount (AM), fill (FI), and uniformity (UN) to avoid lowering the average to make the evaluation look better than it was.